

# Mapping the Economic & Social Cost of Crime:

- area based analysis of the cost of crime.

Andrew Brumwell

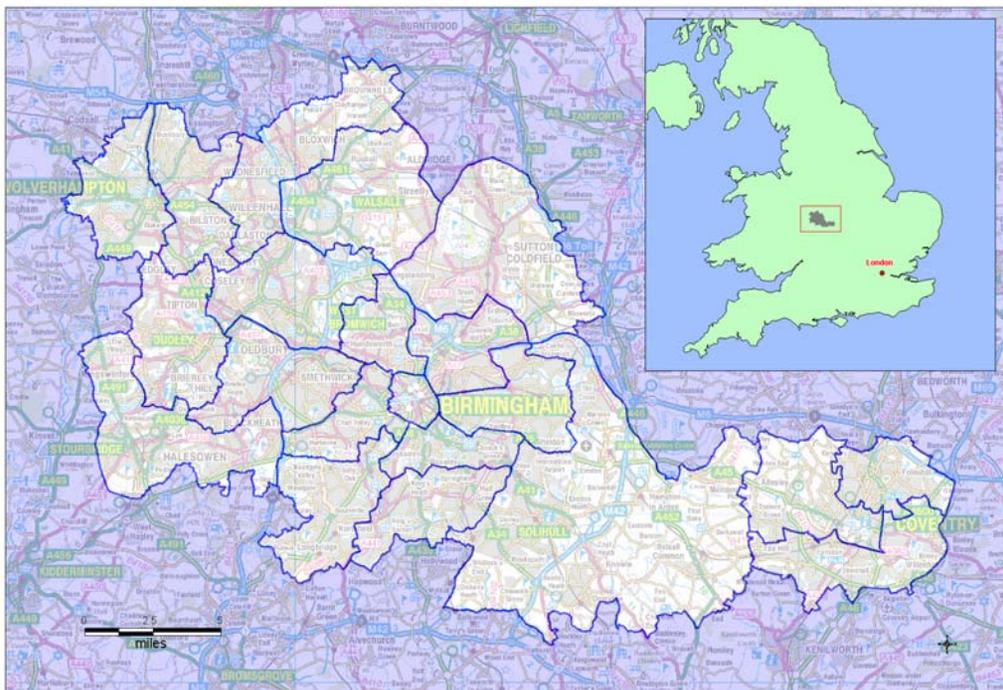
Geo-spatial Intelligence Analyst

Force Intelligence, West Midlands Police, UK



GIS & Crime Mapping

## 9th Crime Mapping Research Conference



**West Midlands Police**  
**Second largest police force**  
**in the UK**

**3 major cities**

- **Birmingham**
- **Coventry**
- **Wolverhampton**
- **& 4 other urban authorities**

**Policing:**

- **21 Operational Command Units (OCUs) -responsible for policing 24/7**
  - 8,200 Police officers
  - 4,000 Police staff
  - 1,000 special constables
  - 500 PCSOs
- **275,000 recorded crimes per year**

**Demographic:**

- **350 square miles (30 by 20 miles)**
- **resident population 2.5 million**
- **very diverse population**



## Why map the economic & social cost.....?

- Traditionally looked at numbers (KPI)
- May prioritize certain crime types – sometimes arbitrary
- Not weighted crimes or looked at full severity, IMPACT or HARM to society
- Restricted our ability to analyse crime and its consequences
- Measure overall cost to victim, business, taxpayer and society
- Increase awareness of full cost to society
- Allows assessment of the relative seriousness of different types of crimes



## Previous research

### **“The Economic and Social Cost of Crime 2000”**

Home Office Research Study 217

Sam Brand and Richard Price (2000)

### **“The Economic and Social Cost of Crime against Individuals and households 2003/04”**

Home Office Online Report 30/05

Richard Dubourg & Joe Hamed (2005)

### **“The Economic Cost of Fire, Estimates for 2004”**

ODPM (2006)

## Previous research

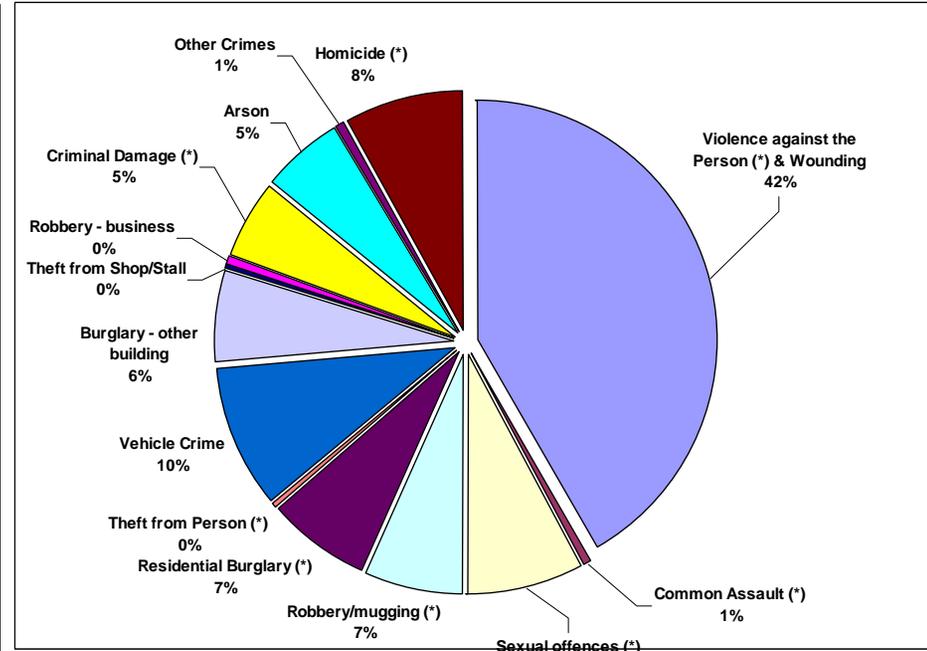
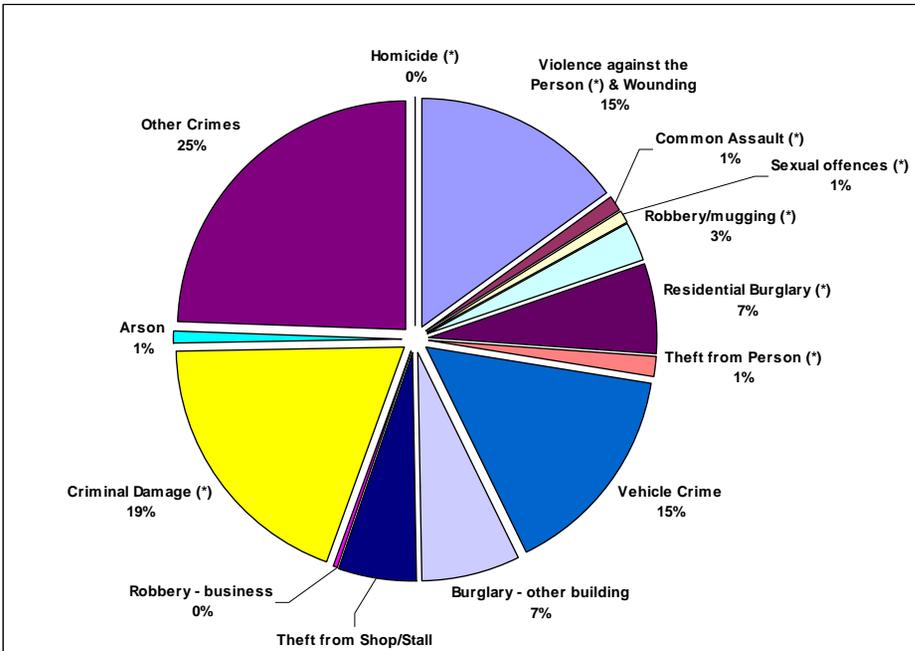
**Most costly crimes were those with large emotional and physical impact**

•Homicide	£1.5 million
•Wounding	£21,400
•Robbery	£ 7,300
•Sexual offences	£31,000

# Comparison of volume and cost of crime by type, 2005/06

### Volume

### Cost



VATP & wounding:

15% of volume,

42% cost

Residential Burglary

7% of volume,

7% cost

Sexual offences:

1% of volume,

8% cost

## Methodology: all you have to do is.....

3 years of crimes (2003/04 to 2005/06)

900,000 recorded crimes

- Assign cost by crime type
- Add cost of arson according to type (not easy !).  
e.g. vehicle arson - car parked at a school



- Point in polygon search of the crime/victim location into areas of interest  
e.g. neighbourhoods or census areas
- Aggregate by area, sum up all the costs



# Change in Number & Cost of Crime by CSP, 2003/04 to 2005/06

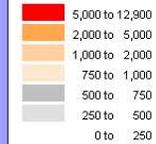




### Costs by census area 2003/04

### Map 1 - Economic & Social Cost of Crime (£,000s), by SOA, 2003/04

Econ & Social Cost (£,000s) of Crime 2003/04



Police Operational Command Unit (OCU) boundary

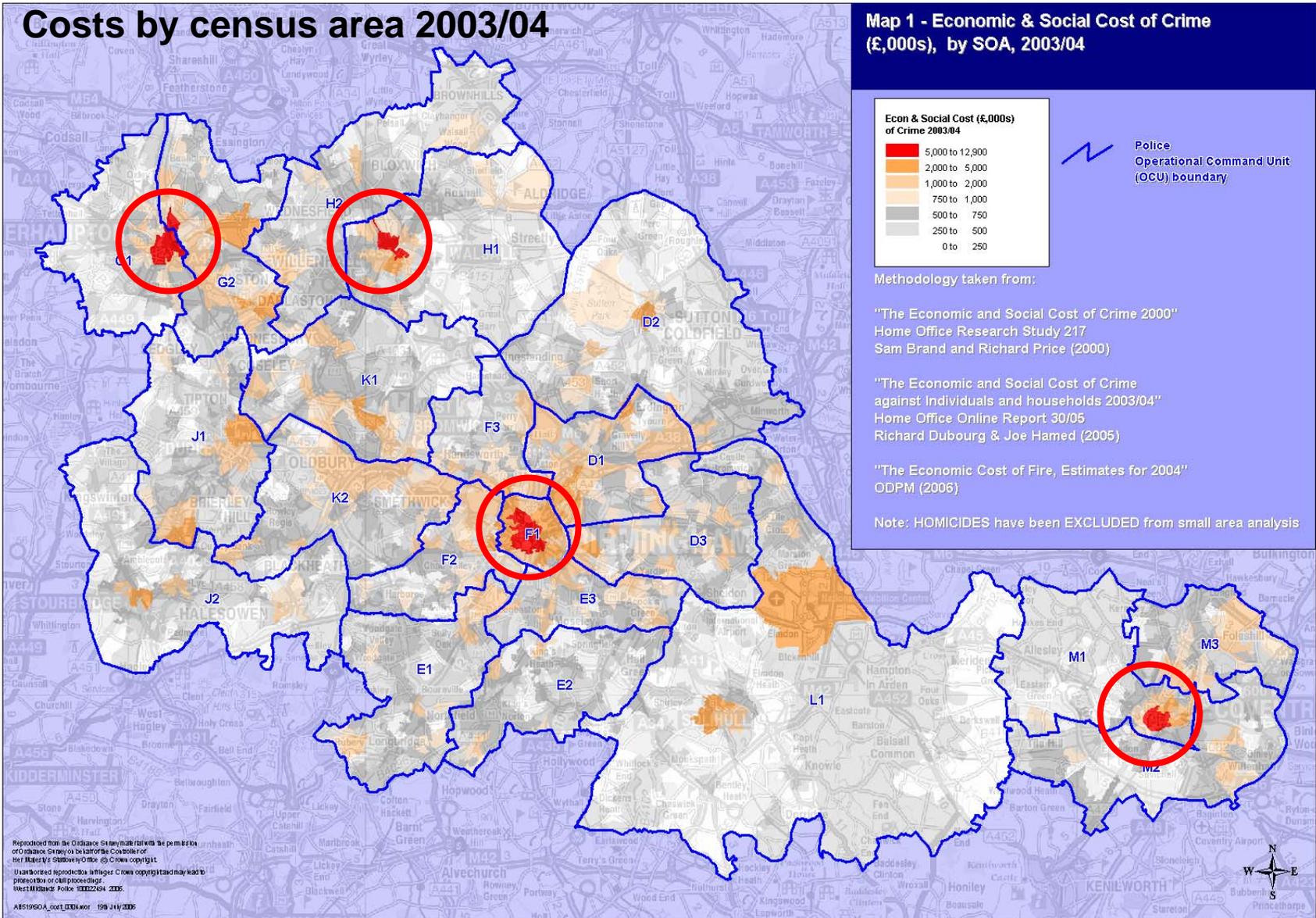
Methodology taken from:

"The Economic and Social Cost of Crime 2000"  
Home Office Research Study 217  
Sam Brand and Richard Price (2000)

"The Economic and Social Cost of Crime against Individuals and households 2003/04"  
Home Office Online Report 30/05  
Richard Dubourg & Joe Hamed (2005)

"The Economic Cost of Fire, Estimates for 2004"  
ODPM (2006)

Note: HOMICIDES have been EXCLUDED from small area analysis

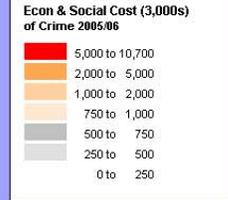


Reproduced from the Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. West Midlands Police 100222694 2006.



### Costs by census area 2005/06

Map 2 - Economic & Social Cost of Crime (£,000s), by SOA, 2005/06



Police Operational Command Unit (OCU) boundary

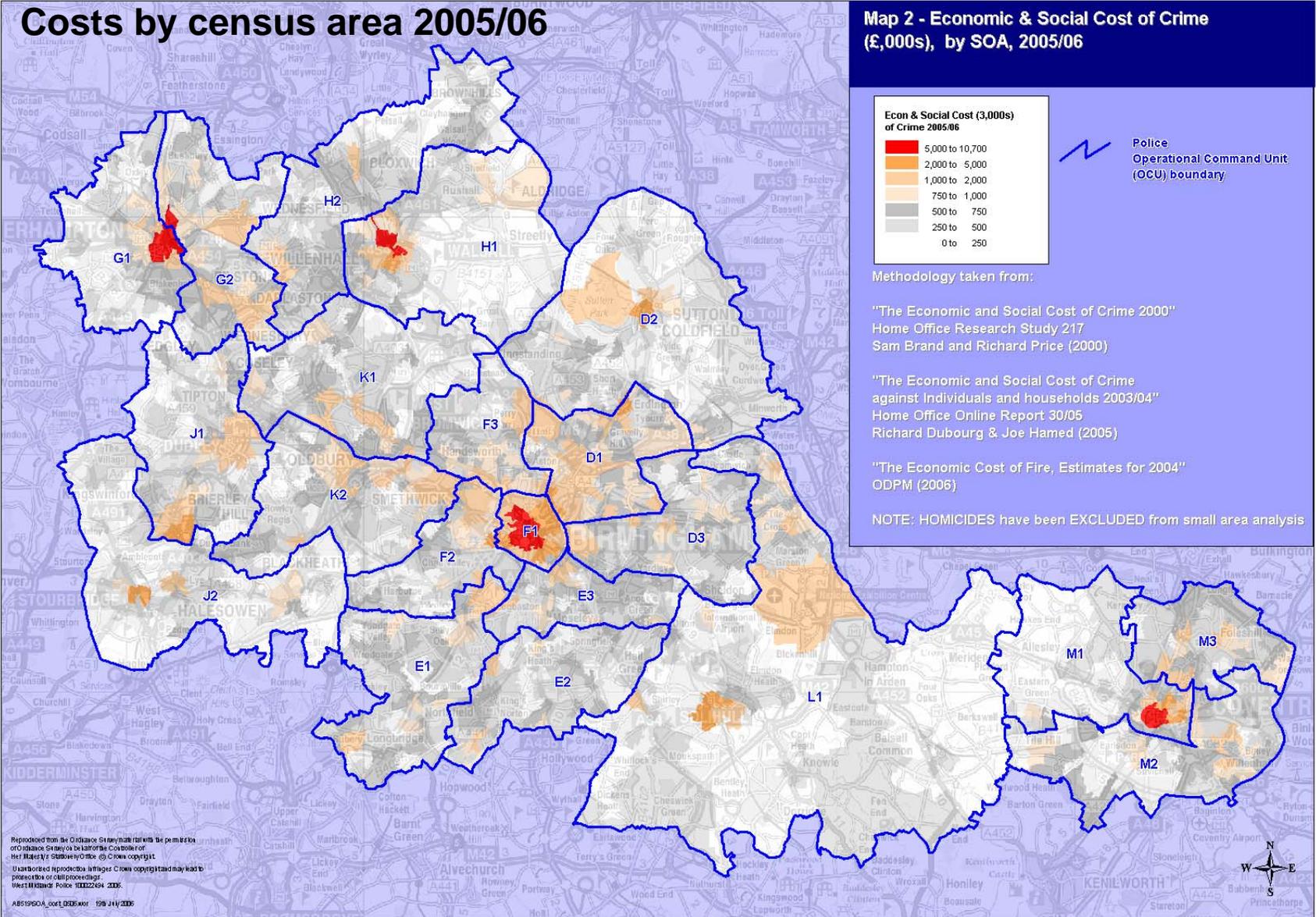
Methodology taken from:

"The Economic and Social Cost of Crime 2000"  
Home Office Research Study 217  
Sam Brand and Richard Price (2000)

"The Economic and Social Cost of Crime against Individuals and households 2003/04"  
Home Office Online Report 30/05  
Richard Dubourg & Joe Hamed (2005)

"The Economic Cost of Fire, Estimates for 2004"  
ODPM (2006)

NOTE: HOMICIDES have been EXCLUDED from small area analysis

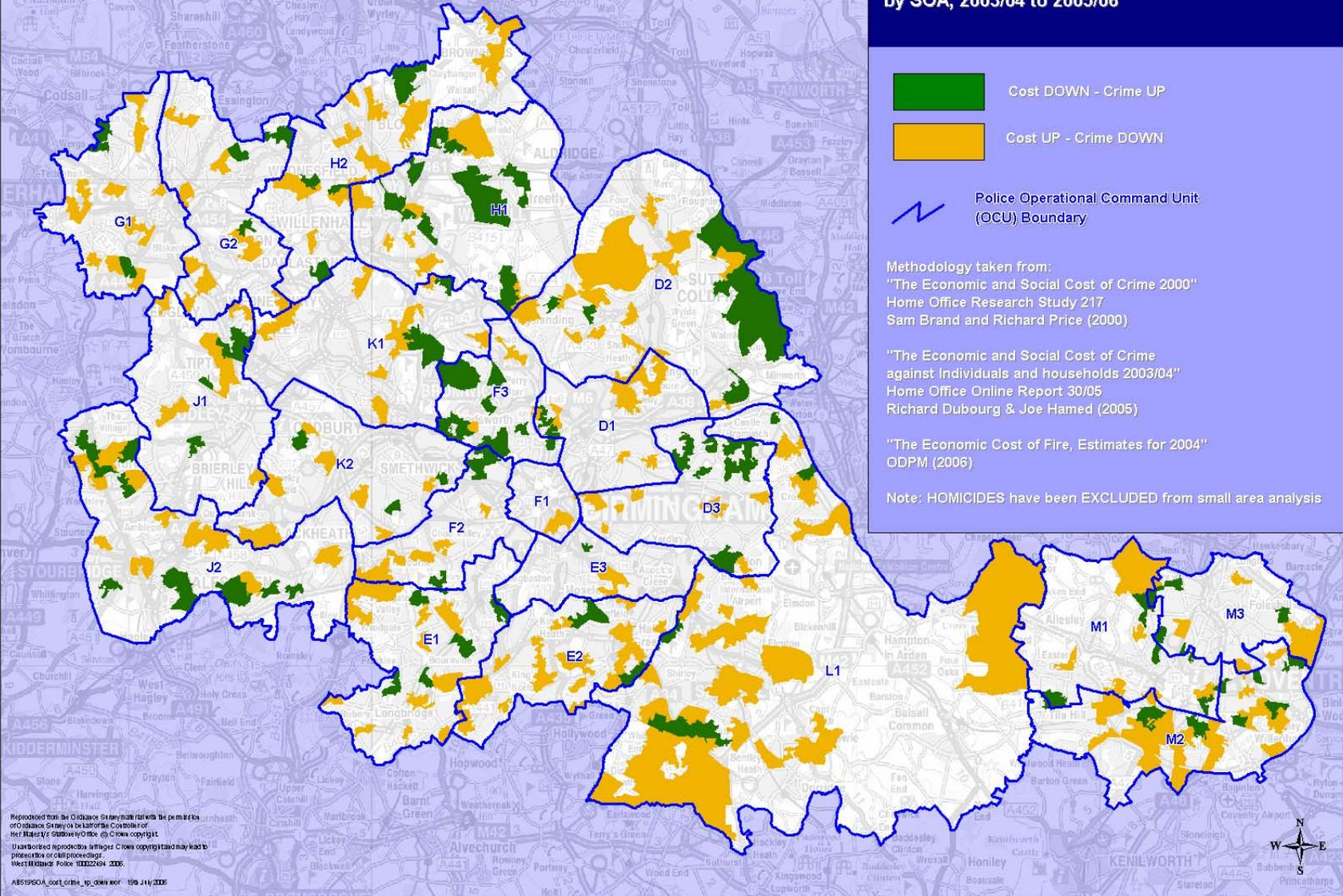


Reproduced from the Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright.  
Unauthorized reproduction in any form without the prior written permission of Ordnance Survey may lead to prosecution or civil proceedings.  
West Midlands Police 100222694 2006.



### Difference in Crime and Cost

**Map 4 - Relative Change in CRIME and COST by SOA, 2003/04 to 2005/06**



- Cost DOWN - Crime UP
- Cost UP - Crime DOWN

Police Operational Command Unit (OCU) Boundary

Methodology taken from:  
 "The Economic and Social Cost of Crime 2000"  
 Home Office Research Study 217  
 Sam Brand and Richard Price (2000)

"The Economic and Social Cost of Crime against Individuals and households 2003/04"  
 Home Office Online Report 30/05  
 Richard Dubourg & Joe Hamed (2005)

"The Economic Cost of Fire, Estimates for 2004"  
 ODPM (2006)

Note: HOMICIDES have been EXCLUDED from small area analysis

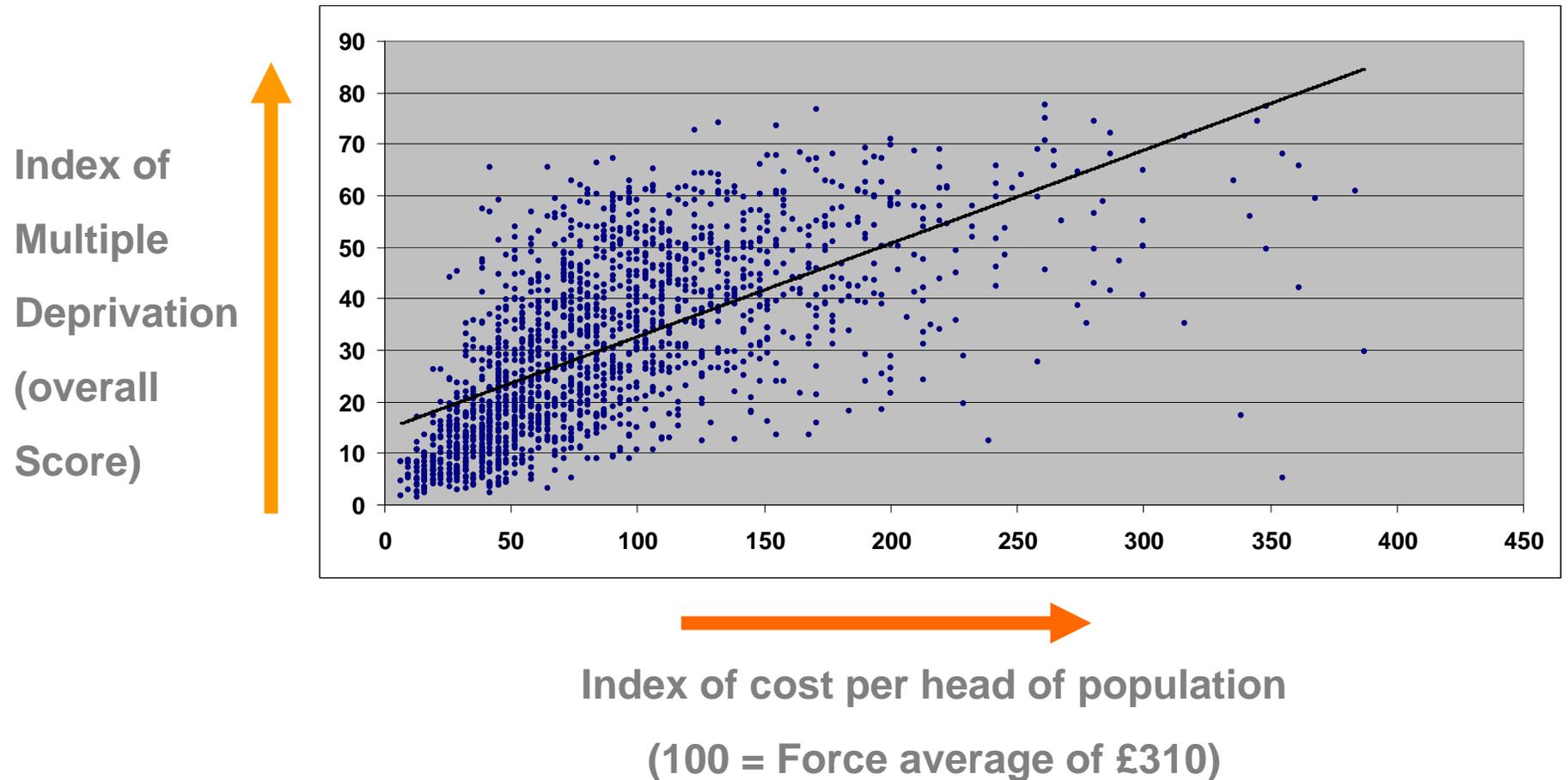
Reproduced from the Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office. © Crown copyright. Unauthorised reproduction in paper form is prohibited without prior permission of Ordnance Survey. West Midlands Police 10022264 2006.



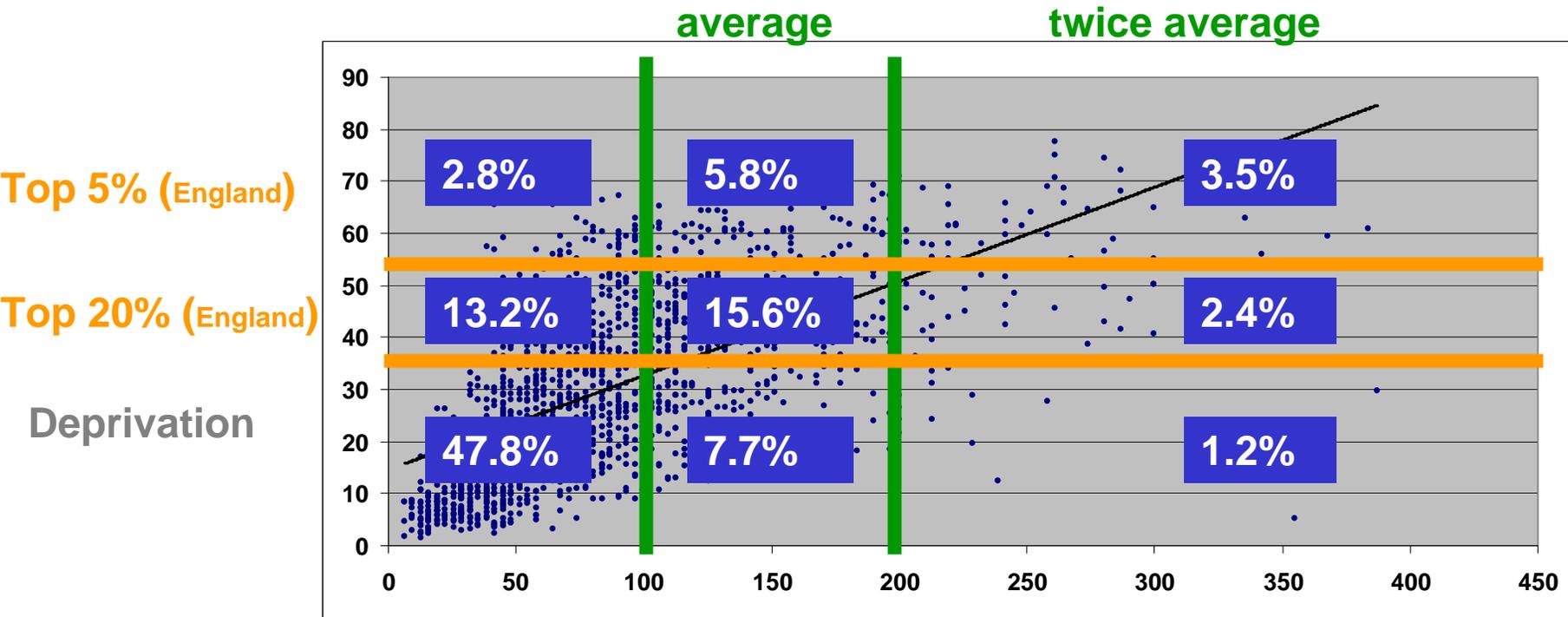




## Costs (per head) & Levels of Deprivation (IMD2004)



# Costs (per head) & Levels of Deprivation (IMD2004)



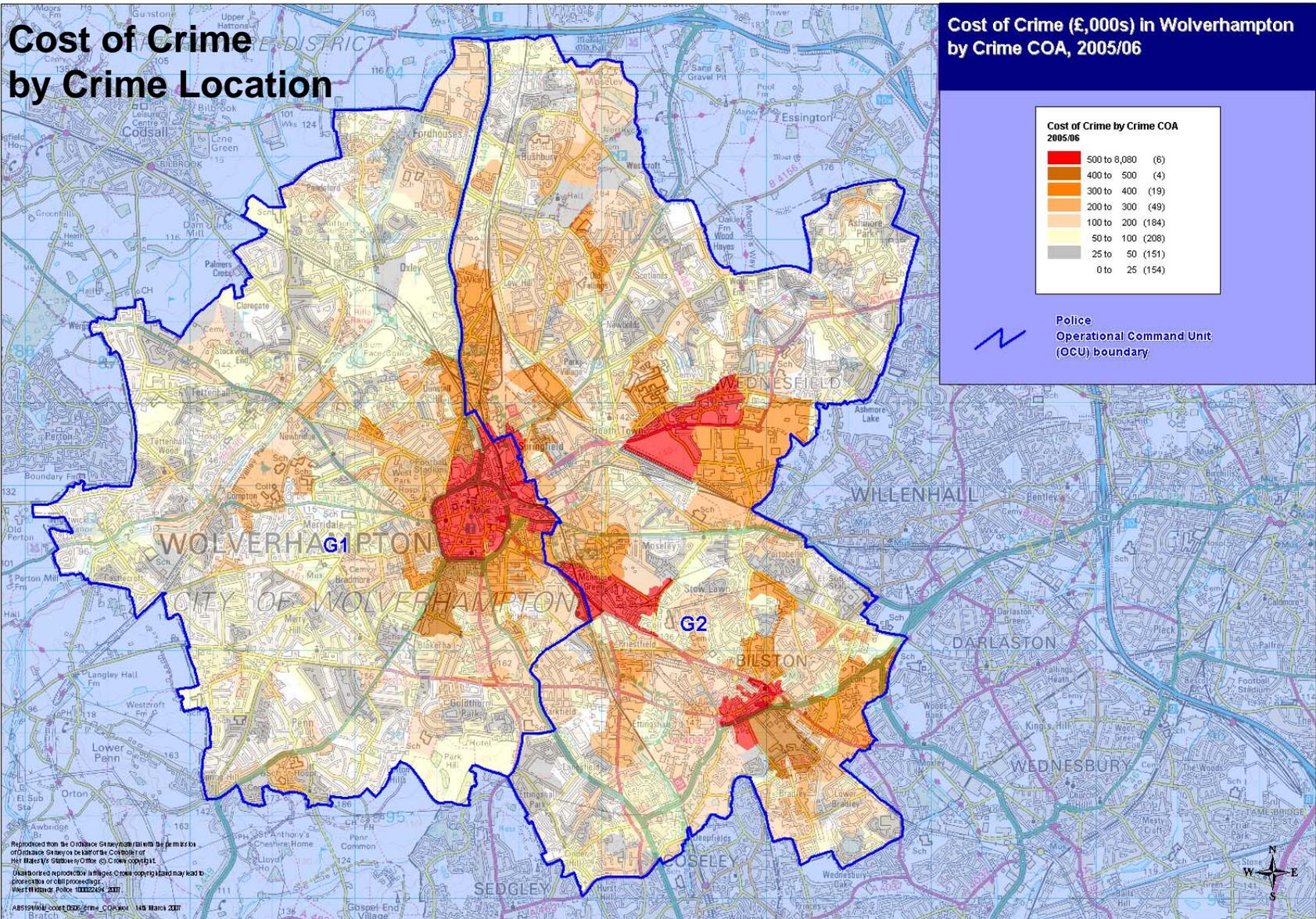
Index of cost per head of population  
(100 = Force average of £310)

# At which location is the “impact” felt?



### Cost of Crime by Crime Location

Cost of Crime (£,000s) in Wolverhampton by Crime COA, 2005/06

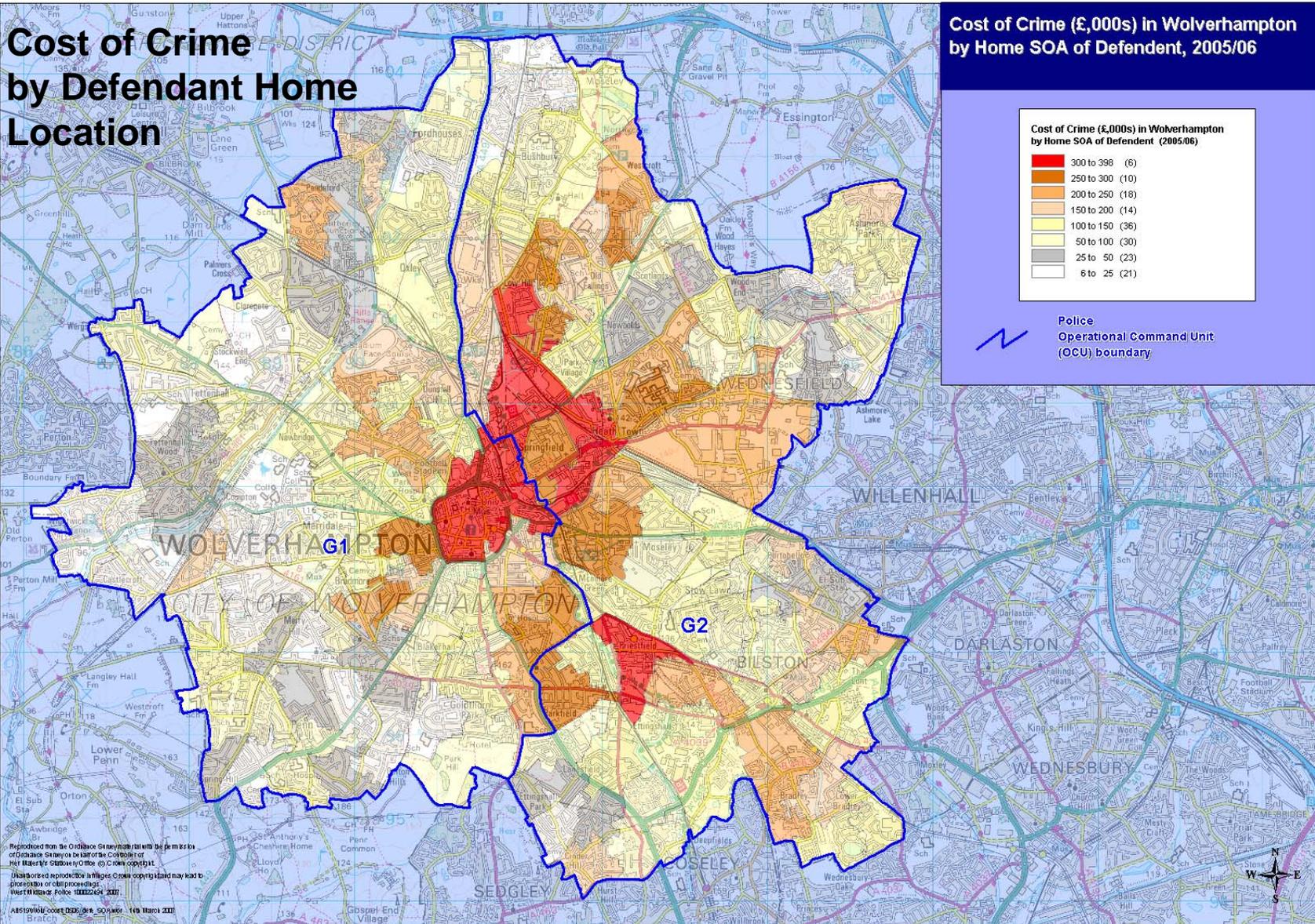


### Cost of Crime by Defendant Home Location

Cost of Crime (£,000s) in Wolverhampton by Home SOA of Defendent, 2005/06

Cost of Crime (£,000s) in Wolverhampton by Home SOA of Defendent (2005/06)	
300 to 398	(6)
250 to 300	(10)
200 to 250	(18)
150 to 200	(14)
100 to 150	(36)
50 to 100	(30)
25 to 50	(23)
6 to 25	(21)

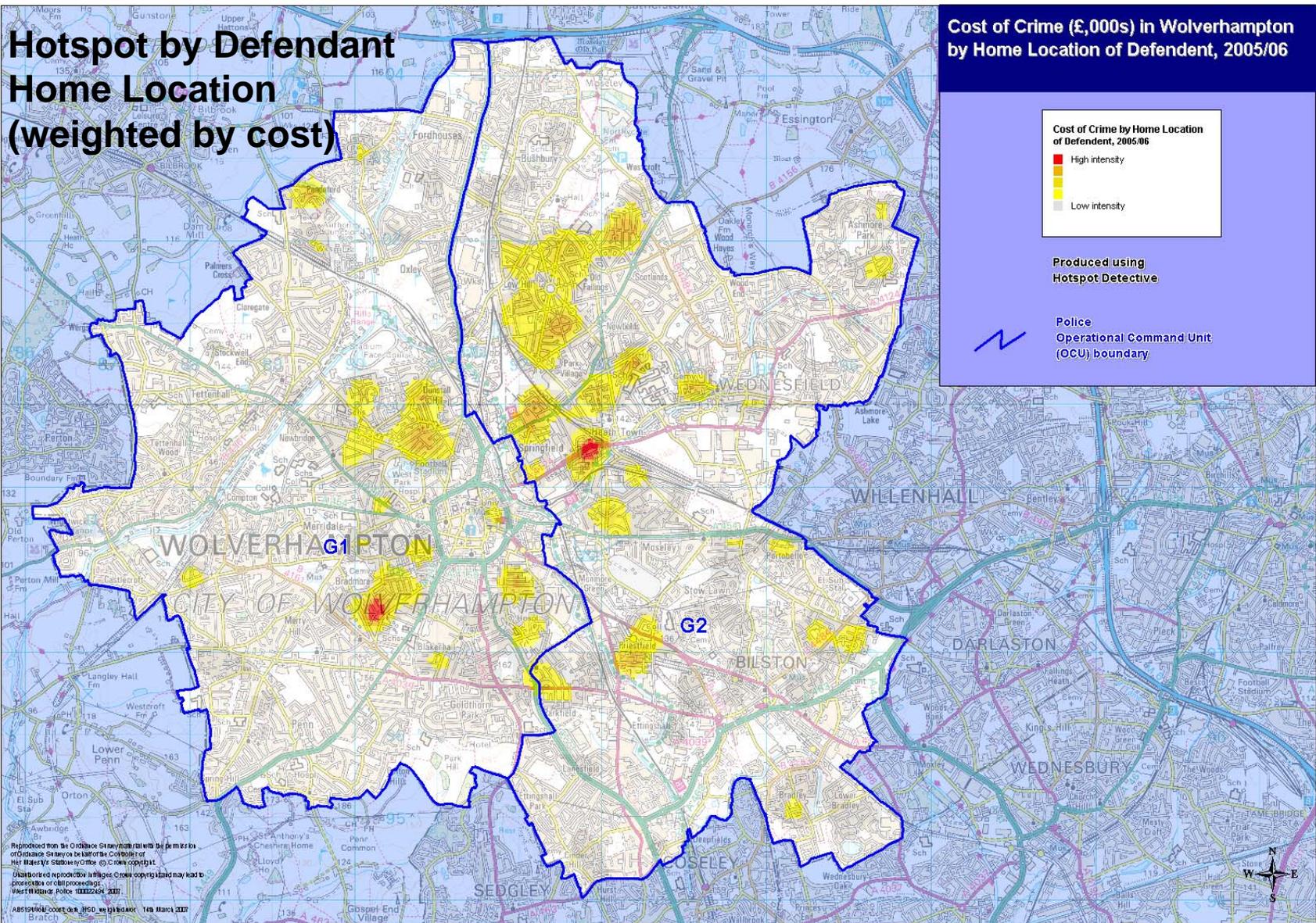
Police Operational Command Unit (OCU) boundary

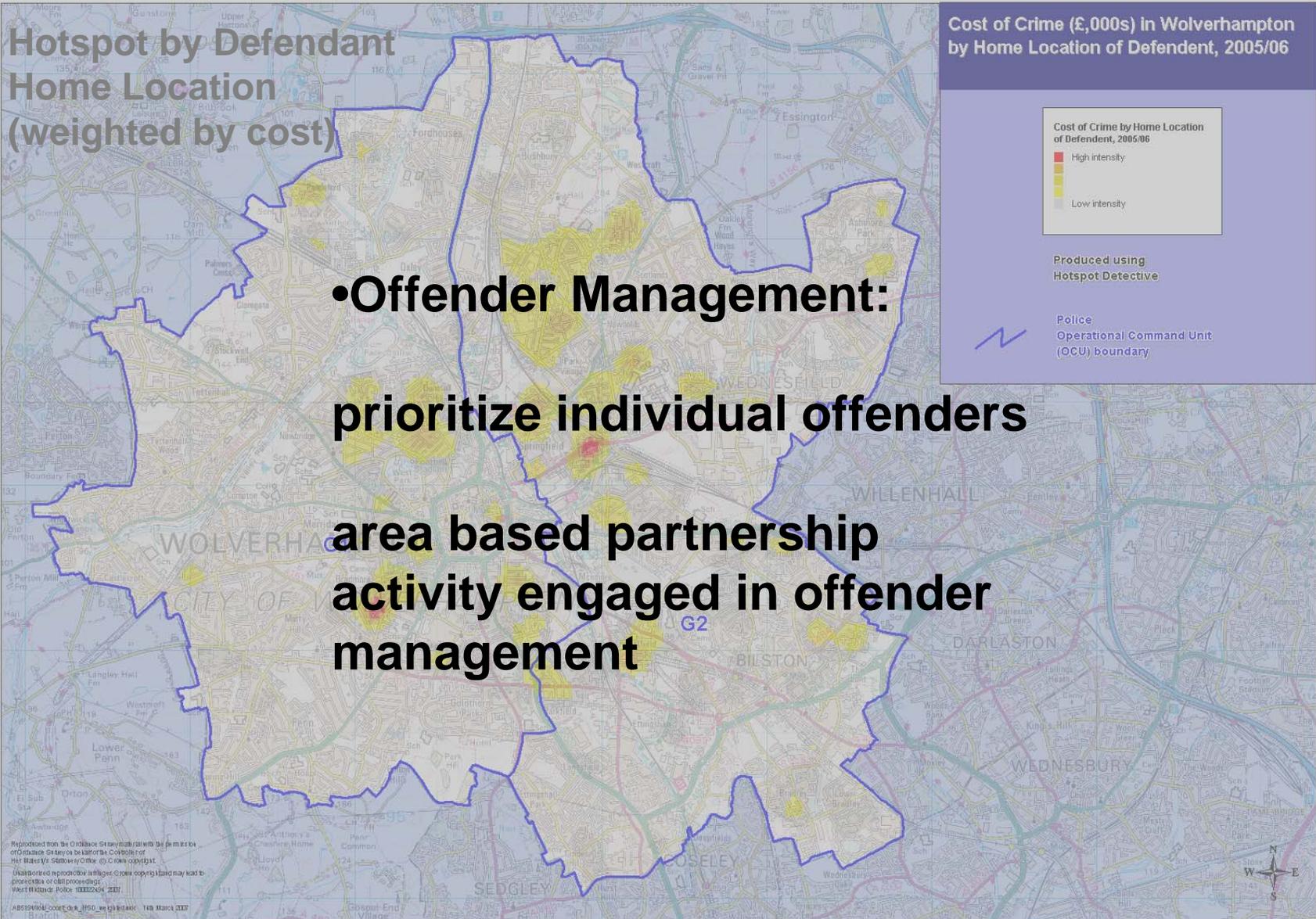


Reproduced from the Ordnance Survey map with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright.  
 Unauthorised reproduction in any form or by any means may lead to prosecution or civil proceedings.  
 West Midlands Police 100022694 2007  
 A05191WML00001 0205 014 500x400 14th March 2007



### Hotspot by Defendant Home Location (weighted by cost)





### Partnership Activity – a cynic’s view



**“A coming together of organisations that in reality have a barely concealed contempt for each other, apparently united in pursuit a superficially considered and ill defined purpose; with the real aim of securing resources of themselves”.**

## Engaging Partnership Activity

### Anticipation of crime (2%)

- Defensive Expenditure & Insurance

### Consequence of crime (78%)

- Physical and emotional impact (50%)
- Value of property stolen/damage/destroyed (10%)
- Victim services (<1%)
- Lost output (12%)
- Health costs (6%)

### In response to crime (20%)

- CJ system

Percentages for crimes against the individual & household (2003)

AVERAGE COST

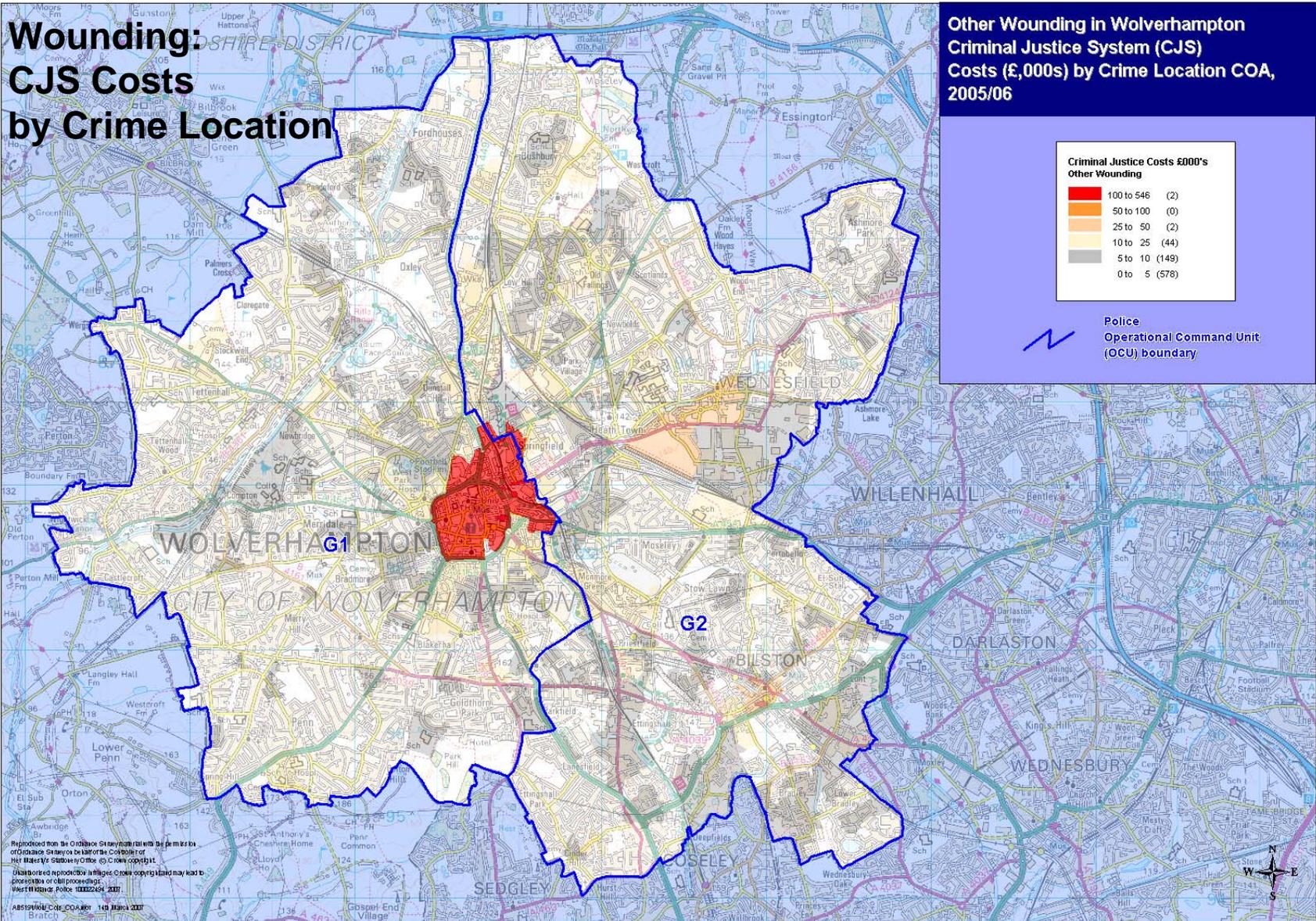


### Engaging Partnership Activity

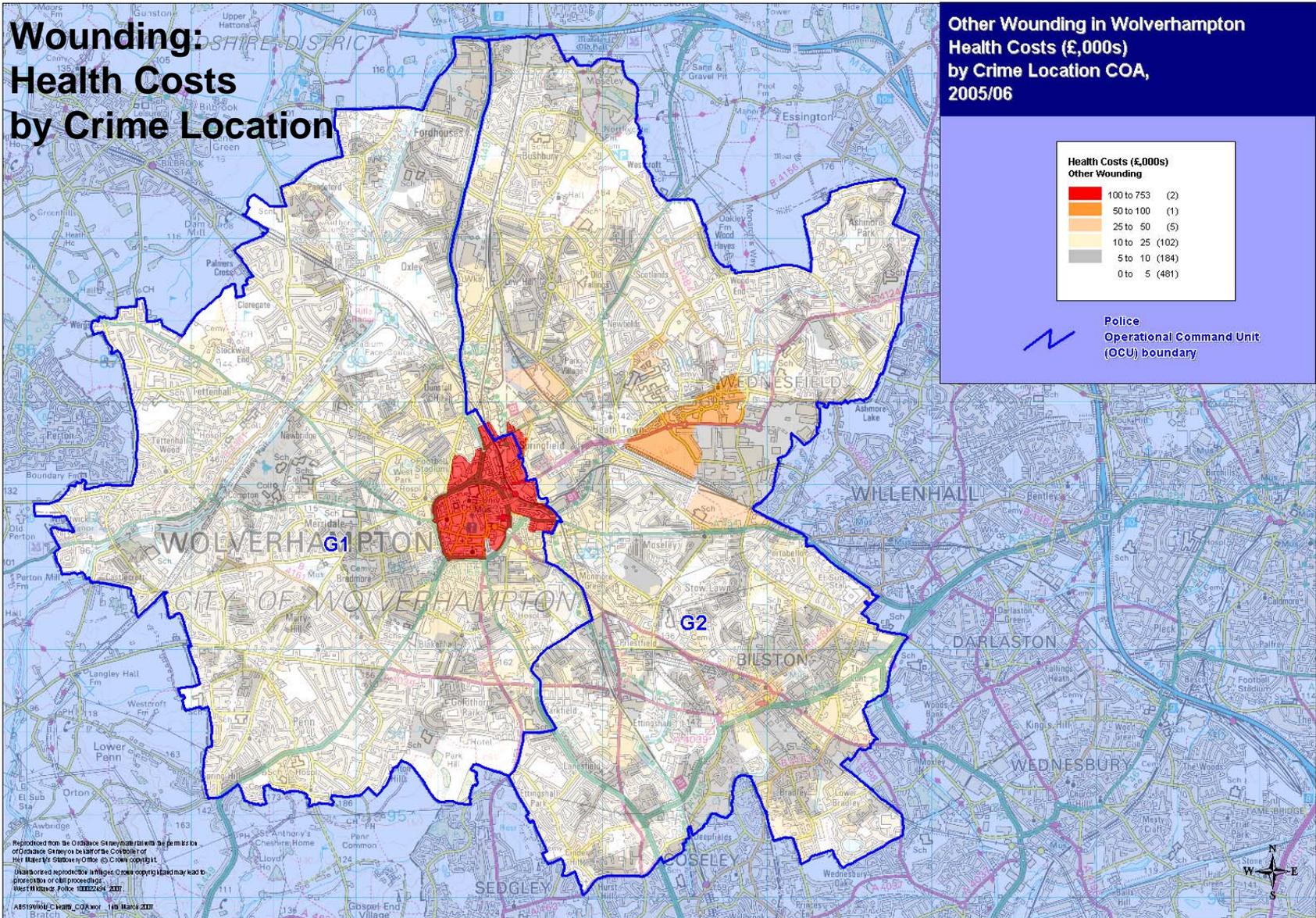
“Other wounding” costs :

Criminal Justice System (CJS)	£ 1,000
Health Services	£ 1,300
Lost Output	£ 1,200
Physical & Emotional Impact	£ 4,600
<b>Total Cost</b>	<b>£ 8,100</b>

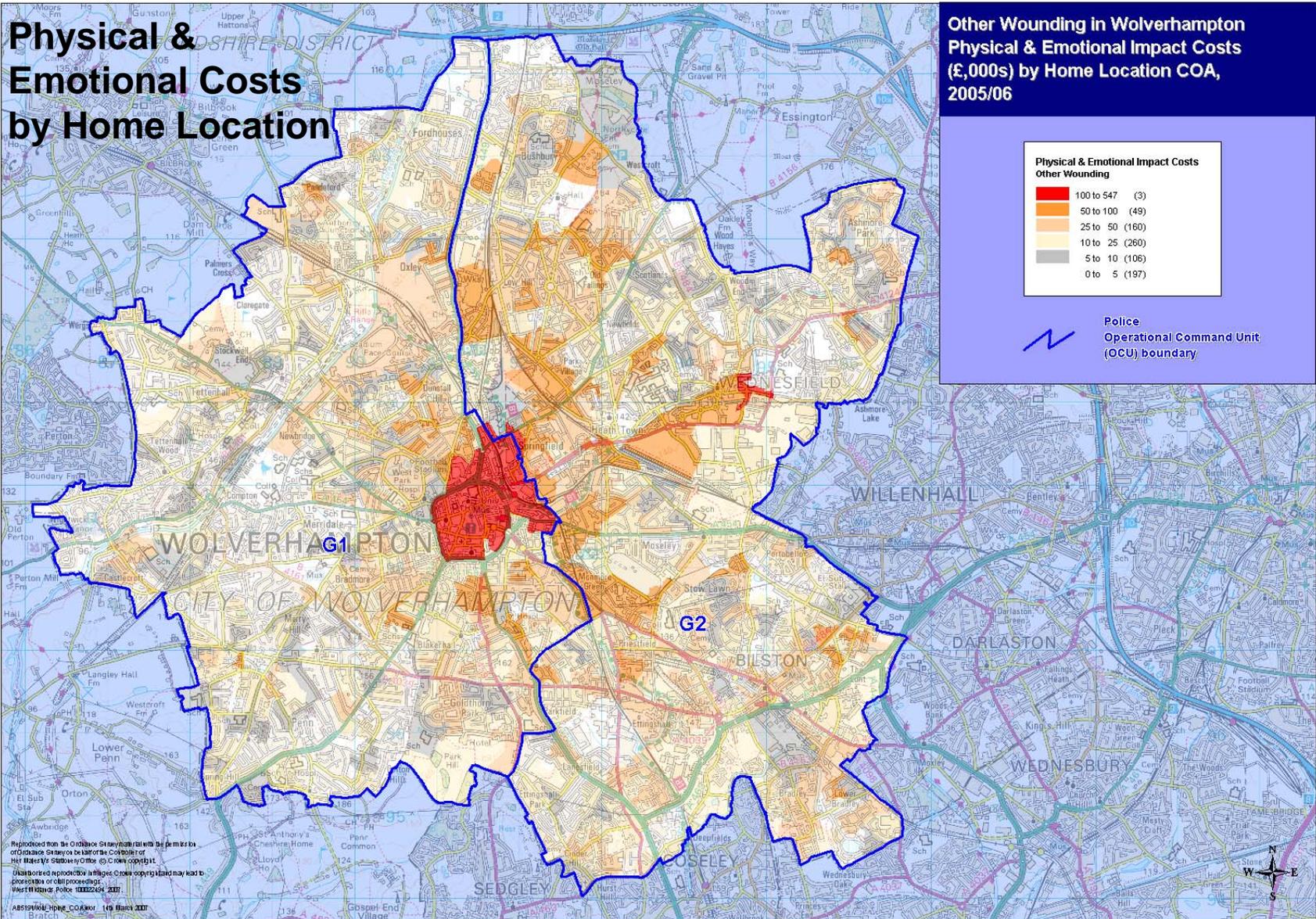
### Wounding: CJS Costs by Crime Location



### Wounding: Health Costs by Crime Location

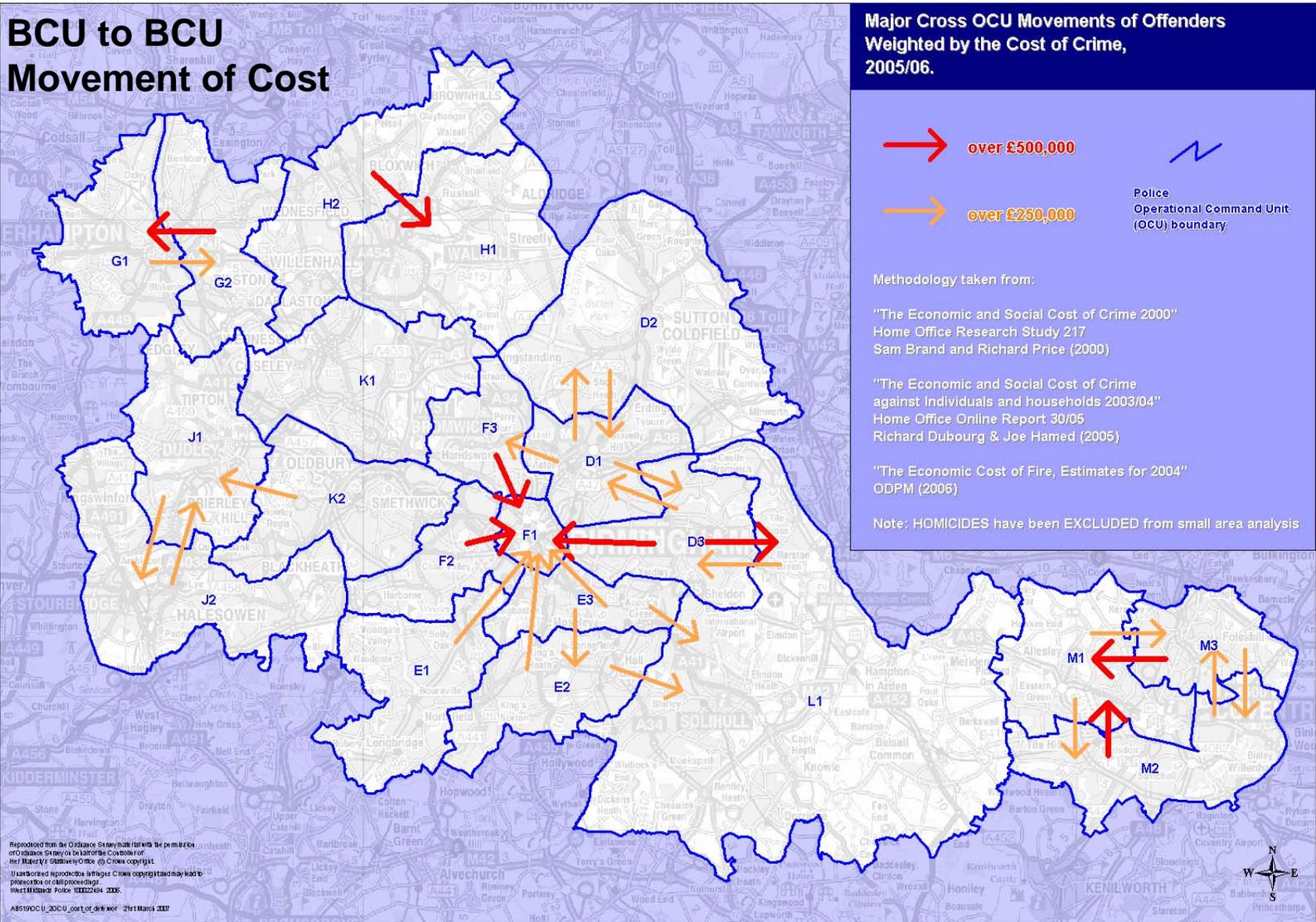


### Physical & Emotional Costs by Home Location



## 9th Crime Mapping Research Conference

### BCU to BCU Movement of Cost



## 9th Crime Mapping Research Conference

### Geodemographics – Postcode Classification



"...I work long hours but as it's a job I enjoy..."



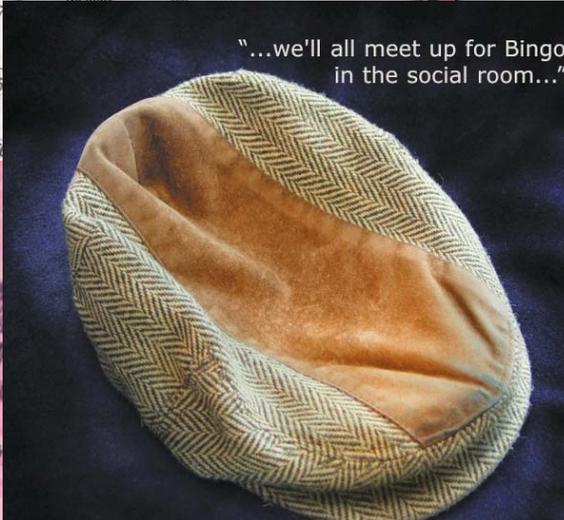
"...I lost my job when the local furniture factory closed down..."



"...we'll all meet up for Bingo in the social room..."



work until Abi starts school full-time..."



"...the weekend is usually taken up with meeting friends..."

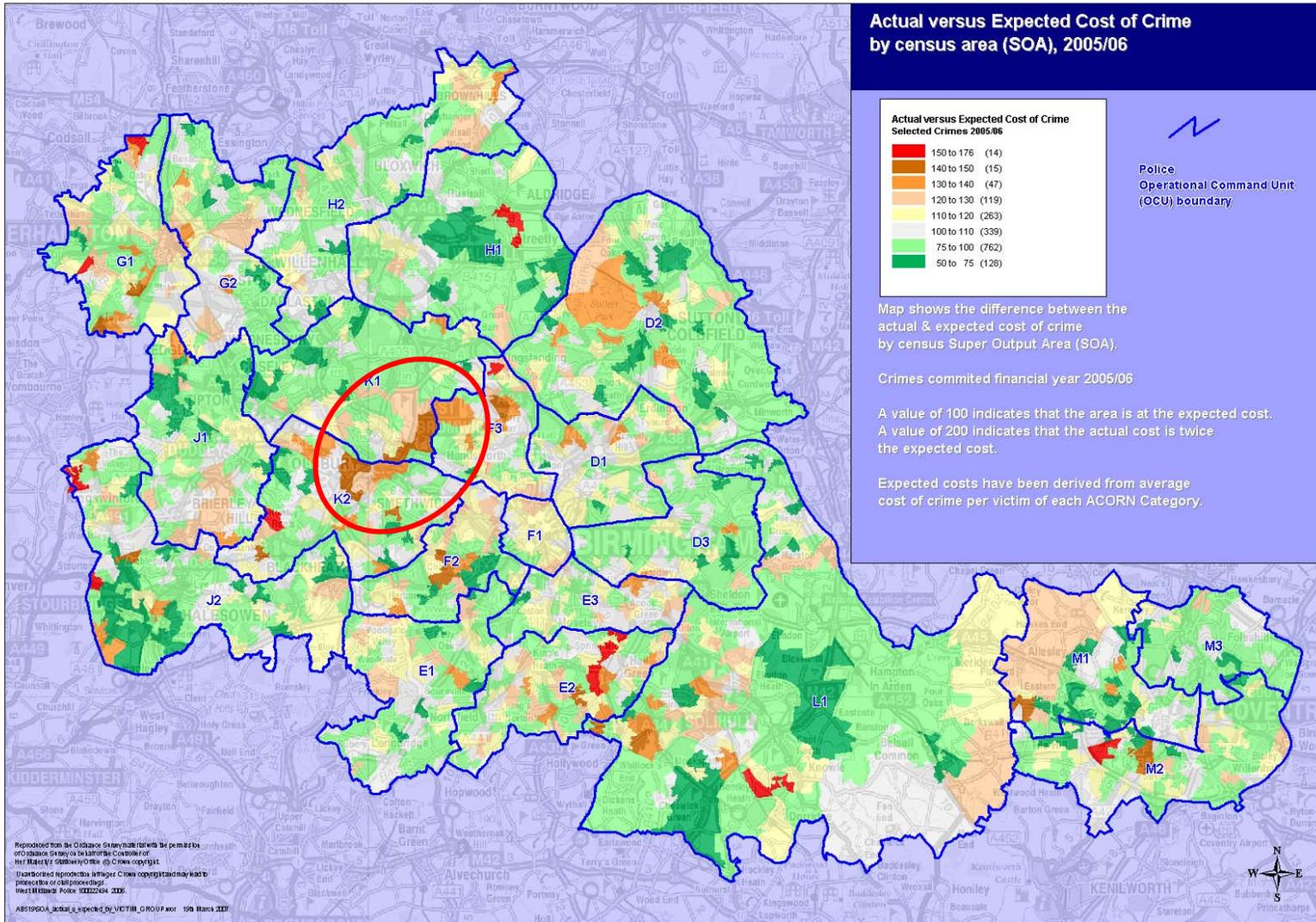
## Using ACORN© Geo-demographics

### ACORN Lifestyle data

- Postcode data - 15-20 houses
- 6 categories - Wealthy achievers to Hard Pressed
- 17 groups - Wealthy executives to Inner City adversity
- 57 types - wealthy working families to single parents local authority housing

- 1) Calculate average cost per victim for each 17 ACORN Groups
- 2) Count number of victims in each census area and apply the average = expected
- 3) Calculate the actual - point in polygon search based on victim home location.
- 4) Compare actual – v's - expected

### Actual v Expected Cost of Crime by Victim Home Location



## Benefits of mapping crime

- Basis for setting priorities and allocating resources
- Justification for resources spent
- Allow meaningful comparisons of costs and benefits offered by alternative crime reduction measures
- Appraisal – value likely to benefit from a policy/action weighed against likely cost
- Policy evaluation – size and benefit accrued from a policy / intervention – i.e. assess the cost effectiveness
- Engage other agencies & partners



Thank you for listening.....

Andrew Brumwell

Geo-spatial Intelligence Analyst

West Midlands Police

+44 (0)845 113 5000 x7800 2653

[a.brumwell@west-midlands.pnn.police.uk](mailto:a.brumwell@west-midlands.pnn.police.uk)



GIS & Crime Mapping



### Costs – Individuals & Households (2003)

Violence against the person	£10,400
Homicide	£1.5 million
Serious wounding	£21,400
Less Serious Wounding	£8,000
Sexual offences	£31,000
Common assault	£1,400
Robbery	£7,300
BDH	£3,300
Theft from person	£634
Theft of vehicle	£4,100
Theft from vehicle	£858
Attempted vehicle theft	£510
Criminal damage	£870



### Costs – Commercial & public sector (2000)

<b>Burglary (BOB)</b>	<b>£2,700</b>
<b>Theft from Shop &amp; Stall</b>	<b>£100</b>
<b>Theft of Commercial Vehicle</b>	<b>£9,700</b>
<b>Theft from Commercial vehicle</b>	<b>£700</b>
<b>Robbery &amp; till snatch</b>	<b>£5,000</b>
<b>Criminal Damage</b>	<b>£890</b>



### Costs – ARSON (2004)

Public sector (e.g. schools)	£41,400
Commercial	£45,000
Vehicle	£5,600
Domestic Property	£26,200